UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/550,188	04/24/2006	Neal O'Gorman	37389-404800	5309

27717 7590 08/11/2008

SEYFARTH SHAW LLP
131 S. DEARBORN ST., SUITE 2400
CHICAGO, IL 60603-5803

EXAMINER	
COOK, JONATHON	

ART UNIT	PAPER NUMBER
2886	

MAIL DATE	DELIVERY MODE
08/11/2008	PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No.	Applicant(s)	
	10/550,188	O'GORMAN ET AL.	
	Examiner	Art Unit	
	JONATHON D. COOK	2886	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE *3* MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *07 May 2008*.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *35-59 and 61-67* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☒ Claim(s) *64 and 65* is/are allowed.

6)☒ Claim(s) *35-46,48-58,62 and 63* is/are rejected.

7)☒ Claim(s) *47,59-61,66 and 67* is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☐ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date *5/07/2008*.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

Detailed Action

Response to Arguments

Applicant's arguments, in regards to the **103 rejection**, filed May 7th, 2008 have been fully considered but they are not persuasive.

Applicant's arguments fail to comply with 37 CFR 1.111(b) because they amount to a general allegation that the claims define a patentable invention without specifically pointing out how the language of the claims patentably distinguishes them from the references. Applicant merely states that Pontis does not show the clock signal and claimed parameters for the free spectral range and finesse and ignores the examiner's statements of obviousness and reasoning behind them. This is not a proper nor convincing response because it fails to present arguments or evidence as to why the examiner is incorrect in his interpretation. Therefore the examiner maintains his rejection. See MPEP 2141 [R-6] section IV.

Applicant's arguments, filed May 7th, 2008, with respect to the **101 rejection** of claim 63 have been fully considered and are persuasive. The amendment of the claim has overcome the rejection and therefore the 101 rejection is withdrawn.

Claim Objections

Claims 66 & 67 are rejected to because of the following informalities:

In Claim 66 the limitation states "alternatively comprises providing a tunable laser." This language is objectionable in the format it is in because it is a dependent claim that depends from claim 59 where the source is a broadband source. Examiner finds the scope indefinite as it is set out because the tunable laser might cover a

different range of wavelengths or a completely different set of wavelengths and this could affect the operation of the device whereas if the limitations in claim 59 said "broadband or tunable laser" it would be understood these are coequal alternatives.

In Claim 67 the limitation refers to "the third Airy etalon" this lacks antecedent basis and the term is improper. Appropriate correction is required.

Claim Rejections - 35 USC § 103

1. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

The factual inquiries set forth in *Graham* **v.** *John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was

not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

2. Claims 35-38, 40-45, 48-58, 62, & 63 are rejected under 35 U.S.C. 103(a) as being unpatentable over **Applicant's Admitted Prior Art** (AAPA) in view of **Pontis et al** (US PAT 6,631,146) (Pontis).

Regarding **Claims 35, 36, 48, 49, 58, & 63**, AAPA discloses and shows in **figs. 1-3** a device for measurement of optical wavelength, comprising:

a coarse monotonic or linear spectral filter (**15**) (applicant's coarse optical filter means) and second photodiode (**151**) (applicant's first optical power measurement means) for measuring the output of the coarse spectral filter and a reference photodiode (**14**) (applicant's second optical power measurement means) for measuring an unfiltered reference beam for coarse wavelength measurement;

two periodic transmission filters (**16, 17**) (applicant's fine optical filter means comprising first and second periodic optical filters) in quadrature (**see fig. 2**), such that peak and troughs of the first filter coincide with linear ranges between peaks and troughs of the second filter, and third and fourth photodiodes (**151,161**) (applicant's optical power measurement means) for measuring output of the two periodic transmission filters in quadrature for fine wavelength measurement, respectively;

a branched waveguide (**see fig. 1**) (applicant's beam splitting means) that splits the optical beam between the unfiltered reference beam and the coarse and fine optical filter means;

processing means for determining the optical wavelength of the optical beam from a predetermined transmissivity-wavelength relationship of the coarse filter and the first and second optical power measurement means for coarse wavelength measurement and from predetermined transmissivity-wavelength relationships of the first and second periodic optical filters and at least one off the third and fourth optical power measurement means for fine wavelength measurement (**Paragraph 55 of instant application**);

AAPA fails to disclose the periodic optical filters having a finesse of 2 and a free spectral range of 100 GHz, the synchronized clock signal measurement means that synchronizes measurement of the output of the first, second, third, and fourth optical power measurement means, and the clock signal comprises a master module and slave module to trigger measurement and read output of the optical power measurement means;

However, Pontis shows in **fig. 6** and teaches sampling signals associated with sensors (**631-634**), photodiodes (**15**) and/or gain medium (**12**) (applicant's slave modules) may be performed synchronously with the generation of the PWM control signals generated by FPGA (**608**) (applicant's master module) (**Column 11, lines 47-50**). The signal which controls this synchronization represents applicant's synchronized clock signal;

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the invention of AAPA with the teachings of the synchronized clock signal measurement means that synchronizes measurement of the output of the first, second, third, and fourth optical power measurement means, and the clock signal comprises a master module and slave module to trigger measurement and read output of the optical power measurement means because it would help reduce the potential noise sources, further such sampling timing would have to be performed in sync to get usable results from the optical power measurement means because they must be compared with one another.

The AAPA as modified by Pontis still fails to teach the periodic optical filters having a finesse of 2 and a free spectral range of 100 GHz;

However, the finesse and spectral range are merely the characteristics of etalons and are determined by the user as needed;

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to have a finesse of 2 and a spectral range of 100 GHz, since it has been held that where the general conditions of a claim are disclosed in the prior art, discovering the optimum or working ranges involves only routine skill in the art. In re Aller, 105 USPQ 233.

Further as to **claims 58 & 63**, the method merely recites the steps performed by the device and thus would have at least been obvious in view of the device.

With regard to **claim 35**, language that does not limit a claim limitation to a particular structure does not limit the scope of the claim. It has been held that the

recitation that an element is "adapted to", "configured to", "designed to", "for", or "operable to" perform a function is not a positive limitation but only requires the ability to so perform and does not constitute a limitation in any patentable sense. *In re Hutchinson*, 69 USPQ 139. Such language also appears in many of the other claims, particularly 56 & 57. While the examiner is addressing these limitations they are not positively limiting.

Regarding **Claims 37**, AAPA discloses the coarse optical filter means comprises a dielectric multilayer coating on a glass substrate (**Paragraph 53 of the instant application**).

Regarding **Claim 38**, AAPA discloses that typically the periodic filters are Fabry Perot etalon filters (**Paragraph 52 of the instant application**).

Regarding **Claim 40**, AAPA discloses the aforementioned but does not explicitly disclose the periodic optical filters have a reflectivity of 25%;

However, this is merely another characteristic of the etalon and it is well within the capability of one of ordinary skill in the art to adjust according to the needs of the user.

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to have the periodic optical filters have a reflectivity of 25%, since it has been held that where the general conditions of a claim are disclosed in the prior art, discovering the optimum or working ranges involves only routine skill in the art. In re Aller, 105 USPQ 233.

Regarding **Claim 41**, AAPA discloses the periodic filter (**16**) with a free spectral range of 50 GHz, but does not disclose the other periodic spectral filter (**17**) with the same.

However, the spectral range is merely a characteristic of etalons and is determined by the user as needed;

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to have a spectral range of 50 GHz for both etalons, since it has been held that where the general conditions of a claim are disclosed in the prior art, discovering the optimum or working ranges involves only routine skill in the art. In re Aller, 105 USPQ 233

Regarding **Claim 42**, AAPA discloses the periodic filters are formed from two parallel dielectric mirrors (Paragraph 53 of the instant application);

The AAPA fails to disclose the filters are made from quartz;

However this is merely a choice of materials well within the realm of abilities of one of ordinary skill in the art;

Therefore, it would have been obvious to one having ordinary skill in the art at the time the invention was made to use quartz, since it has been held to be within the general skill of a worker in the art to select a known material on the basis of its suitability for the intended use as a matter of obvious design choice. In re Leshin, 125 USPQ 416.

Regarding **Claims 43-45**, AAPA as modified by Pontis discloses the aforementioned. The aforementioned Fabry-Perot etalon filters are used to calibrate the optical source, they each have their own output power measuring means, and the

periodic filters have a precisely set or controllable free spectral ranges. Therefore the claimed limitations are met or in the very least obvious because this would merely be a duplication of parts.

Regarding **Claims 50 & 51**, the AAPA as modified by Pontis discloses the above but does not explicitly disclose that the clock signal enables 40,000 points on each of a plurality of channels to be read in 2.5 seconds, or that the synchronized clock signal enables 1,000 to 10,000 wavelength measurements/second;

However, these are merely ranges and it would be well within the capability of one of ordinary skill in the art to set these as needed;

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to have the clock signal enable 40,000 points on each of a plurality of channels to be read in 2.5 seconds, or to have the synchronized clock signal enable 1,000 to 10,000 wavelength measurements/second, since it has been held that where the general conditions of a claim are disclosed in the prior art, discovering the optimum or working ranges involves only routine skill in the art. In re Aller, 105 USPQ 233.

Regarding **Claim 52**, AAPA as modified by Pontis discloses the aforementioned but does not explicitly disclose having a precision of "substantially" 2 picometers or substantially 250 MHz;

However, the claimed prior art is substantially accurate to within those ranges because they are results of the tuning of the etalons to an optimum range and it is well

within the capability of one of ordinary skill in the art to adjust the device for that accuracy given the general structure is present.

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to having a precision of "substantially" 2 picometers or substantially 250 MHz, since it has been held that where the general conditions of a claim are disclosed in the prior art, discovering the optimum or working ranges involves only routine skill in the art. In re Aller, 105 USPQ 233.

Regarding **Claim 53**, AAPA discloses the coarse filter has a response in the C-band and the periodic filters have flat responses (**Paragraph 53 of the instant application**) and that interferometer optical wavelength meters are known for measuring wavelengths in the optical C-band (1525-1565 nm) and optical L-band (1568-1610 nm) (**Paragraph 2 of the instant application**).

Regarding **Claims 54 & 55**, the AAPA discloses the aforementioned subject matter but does not disclose temperature control means for stabilizing optical components thereof or the temperature control means comprises a thermistor or thermocouple and fan cooling or Peltier temperature elements;

However, Pontis teaches temperature sensors (**631-634**) which may be implemented by using a thermistor and temperature controllers (**66, 78, & 79**) which may be implemented using a Peltier device. Particularly the temperature controller (**66**) which regulates the temperature of the etalon;

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the invention of AAPA with the temperature

control means for stabilizing optical components thereof or the temperature control means comprises a thermistor or thermocouple and fan cooling or Peltier temperature elements because the regulation of temperature in optical devices is important because variations in temperature can cause noise in the signal, this goes doubly so for etalons which are often tuned to different wavelength peaks by temperature variations.

Regarding **Claim 56**, AAPA as modified by Pontis teaches the aforementioned but AAPA does not teach external triggering for synchronization with external instrumentation;

However, Pontis teaches that the measurements are synchronized with the PWM signals generated by an FPGA (**608**) and that the FPGA works in conjunction with a microprocessor (**602**) (applicant's external trigger) to operate and measure various parameters with the laser assembly (**10**) (applicant's external instrumentation) in order to control the entire system (**Column 10, lines 37-42**);

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the invention of AAPA with the teachings of external triggering for synchronization with external instrumentation because the adaptation of a processor for external triggering is well known and useful to allow one to easily modify the function of the system as needed.

Regarding **Claims 57 & 62**, the AAPA discloses the aforementioned but does not explicitly disclose the apparatus arranged to measure infrared or visible wavelengths;

However, the use of etalons to filter and photodiodes to measure any particular wavelength is well within the capability of one of ordinary skill in the art depending on the needs at the moment.

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to measure infrared or visible, since it has been held that where the general conditions of a claim are disclosed in the prior art, discovering the optimum or working ranges involves only routine skill in the art. In re Aller, 105 USPQ 233.

3. Claims 39 & 46 are rejected under 35 U.S.C. 103(a) as being unpatentable over **AAPA** in view of **Pontis** and further in view of **Colbourne et al** (PGPub 2001/0021053) (Colbourne).

Regarding **Claims 39 & 46**, AAPA as modified by Pontis teaches the aforementioned but does not disclose the phase offset between the first and second periodic optical filters in quadrature is tuned by angle, temperature, or pressure using a piezoelectric transducer;

However, Colbourne teaches that varying the optical path length between the etalon end faces (applicant's phase offset) can be accomplished by providing a temperature change to the etalon (**Paragraph 78**);

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the invention of AAPA as modified by Pontis with the first and second periodic optical filters in quadrature is tuned by angle, temperature,

or pressure using a piezoelectric transducer because it would allow for the fine tuning of the filters in case they needed to be adjusted to remain in quadrature.

Allowable Subject Matter

Claims 64 & 65 are allowed.

Claims 66 & 67 would be allowable if rewritten to overcome the objection(s), set forth in this Office action and to include all of the limitations of the base claim and any intervening claims.

Claims 47, 59, & 61 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

As to **Claims 47 & 64**, the prior art of record, taken alone or in combination, fails to disclose or render obvious free spectral range of the calibration etalon filter differs just sufficiently from the free spectral range of the periodic optical filters that the calibration etalon filter is in phase only at top, middle and bottom wavelengths of a range of measurements of interest to obtain co-incident or Vernier-like maximum power at those wavelengths, in combination with the rest of the limitations of the claim.

As to **Claims 59 & 65**, the prior art of record, taken alone or in combination, fails to disclose or render obvious calibrating the processed readout from fine periodic filters to the reference wavelength of the calibration etalon filter, in combination with the rest of the limitations of the claim.

Conclusion

THIS ACTION IS MADE FINAL. Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to JONATHON D. COOK whose telephone number is (571)270-1323. The examiner can normally be reached on Mon-Fri 9:00am to 5:30pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Tarifur Chowdhury can be reached on (571)272-2287. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

Jonathon Cook
Patent Examiner
AU:2886
August 4th, 2008

/TARIFUR R CHOWDHURY/
Supervisory Patent Examiner, Art Unit 2886